

Application Serial No. 10/587,140
Reply to Office Action of October 10, 2007

PATENT
Docket: CU-4971

REMARKS

In the Office Action, dated October 10, 2007, the Examiner states that Claims 12-28 are pending, and Claims 12-28 are rejected. By the present Amendment, Applicant amends the claims.

In the Office Action, Claims 12-28 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting over co-pending Application No. 11/039,278. Claims 12, 19, 21, 23, 25 and 27 are also provisionally rejected over co-pending Application No. 10/587,069. A terminal disclaimer is submitted herewith to overcome these rejections.

Claims 12, 23 and 25 are rejected under 35 U.S.C. §102(b) as being anticipated by Gibbons (US 2003/0232930). Claims 19 and 21 are rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons in view of Yamazaki (US 2003/0058210). Claim 27 is rejected under 35 U.S.C. §103(a) as being unpatentable over Gibbons in view of Walker (US 5,977,942). Claims 12-18, 24 and 26 are rejected under 35 U.S.C. §103(B) as being unpatentable over Kim (US 6,153,272 in view of Gibbons. Claims 20 and 22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kim in view of Gibbons and Yamazaki. Claim 28 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kim in view of Gibbons and Walker. The Applicant considers that the amendments to the claims overcome these rejections.

Independent Claim 12 has been amended to incorporate the features of Claim 21. Claim 12 has also been amended to include the phrase "from each other". Support for this amendment may be found at least in lines 13-15 on page 10 of the application which states that "the compositions of the upper and lower photo alignment layers, which sandwich the ferroelectric liquid crystal, are made different from each other". The phrase "with the ferroelectric liquid crystal sandwiched therebetween" has been deleted from Claim 12 to clarify that claim.

In the amended Claim 12 (present invention), since the constituent material of the respective photo alignment layers have a different composition from each other, generation of orientation defects such as double domains can be restrained and mono-domain alignment of the ferroelectric liquid crystal can be obtained. In other words, the present invention solves the problem that a ferroelectric liquid crystal which has no smectic A phase in its phase series easily generates double domains,

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and the present invention can achieve the advantageous effect of restraining the generation of double domains by having different compositions in the constituent materials of the photo alignment layers.

Example 19 of Gibbons does not disclose that a constituent material of the respective photo alignment layers have a different composition from each other. Further, Gibbons is completely silent regarding its preference in using different kinds of polymers for the respective two optical alignment layers.

Moreover, Gibbons is completely silent regarding the orientation defects of the ferroelectric liquid crystal. As the rejection admits in page 5 of the Office Action, Gibbons fails to disclose that the ferroelectric liquid crystal does not have a smectic A phase in a phase series thereof.

Kim does not disclose that a constituent material of the respective photo alignment layers have a different composition from each other. Although Kim discloses chiral smectic liquid crystals (lines 29-39 of column 5) and a ferroelectric liquid crystal (claim 20), it is completely silent regarding the orientation defects of the ferroelectric liquid crystal. As the rejection admits in page 9 of the Office Action, Kim fails to disclose that the ferroelectric liquid crystal does not have a smectic A phase in a phase series thereof.

Yamazaki discloses a ferroelectric liquid crystal in which exhibits mono-stability and which has no smectic A phase in its phase series, but it is completely silent regarding orientation defects of the ferroelectric liquid crystal. In contrast, as mentioned the constituent material of the respective photo alignment layers have a different composition from each other in the present invention. Accordingly, generation of double domains can be restrained when the ferroelectric liquid crystal with no smectic A phase in its phase series is used.

The invention of amended Claim 12 and that of Gibbons use different kinds of ferroelectric liquid crystals (different phase series). Further, as mentioned, Gibbons does not clearly disclose using different kinds of polymers in the optical alignment layers and it is completely silent in its preference in using different kind of polymers for respective optical alignment layers. Moreover, Gibbons is also completely silent regarding the prevention generation of orientation defects.

Although Yamazaki discloses the use of a ferroelectric liquid crystal which has no smectic A phase in its phase series, it is completely silent regarding the object of

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preventing generation of orientation defects.

Also, although Kim discloses a chiral smectic liquid crystal (lines 29-39 of column 5) and a ferroelectric liquid crystal (claim 20), it does not disclose that the ferroelectric liquid crystal does not have a smectic A phase in a phase series thereof. Further, Kim is completely silent regarding the orientation defects of the ferroelectric liquid crystal.

Accordingly, even if Gibbons and Yamazaki are combined, or Kim is further added to the combination, a person skilled in the art would not easily achieve the technical structure of amended Claim 12 which solves the problem of the ferroelectric liquid crystal with no smectic A phase in its phase series.


Therefore, the invention of amended Claim 12 is not considered the same as, or obvious from, any of the cited references either alone or in combination.

In light of the foregoing response, all the outstanding objections and rejections are considered overcome. Applicant respectfully submits that this application should now be in condition for allowance and respectfully requests favorable consideration.

Respectfully submitted,

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Date



Attorney for Applicant
Brian W. Hameder
c/o Ladas & Parry LLP
224 South Michigan Avenue
Chicago, Illinois 60604
(312) 427-1300
Reg. No. 45613